

TDEC Risk and Fish Consumption Scenarios

Process for consideration

1. Meet risk of 1×10^{-5} with discharges without treatment at end of pipe. If not,
2. Use wastewater treatment to meet risk of 1×10^{-5} at end of pipe. If still unable to meet risk,
3. Use reasonable maximum exposure (RME) site-specific (extrapolated out to a future scenario) fish consumption to meet risk.
4. TDEC agrees with DOE that a robust fish and surface water sampling program should be implemented.

Some Uncertainty considerations

1. Extrapolating limited data from our current time out to a future scenario.
2. Fish populations in the future may be more robust (hopefully) than today.
3. Recreational use of the area may increase as DOE activities decrease.
4. Future habitat changes may impact fishing in the future.

Potential Overall Process Outline

1. Baseline – A baseline is needed to measure any site-specific calculations against.
 - a. End of pipe
 - b. Use all default inputs and 22 g/day for 350 days (approximately 45 – 6 oz meals or approximately 34 – 8 oz meals)
 - c. No dilution
 - d. No treatment
2. Baseline with Wastewater Treatment – TDEC agrees with DOE that some professional judgement will ultimately be needed when assessing any site-specific inputs. Especially when trying to extrapolate site-specific inputs that are relevant for a future that has not occurred yet. If treatment allows the base case to be met, we will all save countless hours of debate.
 - a. End of pipe
 - b. Use all default inputs and 22 g/day for 350 days (approximately 45 - 6 oz meals or approximately 34 – 8 oz meals)
 - c. No dilution
 - d. Assume removal efficiency for standard radionuclide treatment of wastewater
3. Potential Future Site-Specific Fish Consumption – (site-specific current conditions and exposure calculations are less problematic than extrapolating for a potential future scenario.)
 - a. Using consumption of 22 g/day
 - b. Use highest potential consumption scenario of the three locations
 - c. Include previously collected community data into the calculations (example: available 2019 and 2020 community data show a potentially more realistic RME (difficult to determine with limited datasets) for BCK 3.3 than the 2021 DRAT survey data)
 - d. Use fish greater than or equal to 30 g
 - e. Assume fisher eats all fish caught – no particular species of fish is preferred

- f. Assume edible portion is (we ended up using a range for this DRAFT and would need more time to hone in on values using publish research, if available) of each fish by weight
 - g. Assume a 6-hour fishing trip and use 95UCL (student's-t) of TWRA's 2018 creel report catch per hour estimates from Melton Hill and/or Norris Dam as a regional estimate of catch success. Adjust catch success percentage by dividing TWRA's catch per hour rate for a 6-hour trip by the number of edible-size fish at each POE.
 - h. Assume fishes 9 months (per TDEC creel survey) including 4 trips a month or 1 trip a week.
 - i. Assume 171 g (approximately 6 oz) per meal
 - j. Use site-specific fish meals for fish consumption parameter
4. TDEC agrees with DOE that a robust fish and surface water monitoring program should be implemented.

Example Calculation (using highest potential consumption scenario)

EFK 1.0 (surveyed 1007 m²)

POE = EFK 0.0 – 1.0 (1 km)

25 fish \geq 30 g documented

Total weight of fish greater than or equal to 30 g = 1780g

- a. Use fish greater than or equal to 30 g - 1780g
- b. Assume fisher eats all fish caught – no particular species of fish is preferred
- c. Assume edible portion is 1/3 to 1/2 (Using a range. We would need more time to hone in based on publish research, if available) of each fish by weight – 593.33 g - 890 g
- d. Assume 6 hours fishing per trip and catch per hour 95UCL – (student's t) of 1.213 fish/hr (TWRA 2018 Creel report, catch per hour range 0.14 – 2.05) = 7.28 fish per trip of 25 total edible fish = 29.12% fish catch rate for EFK 1.0
- e. Assume fishes 9 months (per TDEC creel survey) including 4 trips a month – 9,330 grams/yr
- f. Assume 171 g (approximately 6 oz) per meal
- g. Use site-specific fish meals for fish consumption parameter
 - a. 36.4 to 54 fish meals